mitex FI VFC 2 x 20

Alphanumeric VFC Display with Profibus Interface

User's Manual

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1 General

This bus compatible VFC monitor with Profibus DP interface has been designed as a panel mount display for industrial applications.

The monitor consists of a vacuum fluorescent display. Two lines of text with 20 characters each can be displayed. Each character is displayed with a resolution of 5 x 7 pixels. Character height is 10.5 mm (0.41 inches).

A physical RS 485 interface with Profibus DP protocol is used for serial communication.

Predefined texts can be downloaded and saved to the display via the RS 232 interface.

Features:

- Profibus DP interface
- Text downloads via RS 232
- Text memory (up to 255 texts with 40 characters each)
- Metal DIN panel mount housing with special surface finish
- Designed for use in industrial applications

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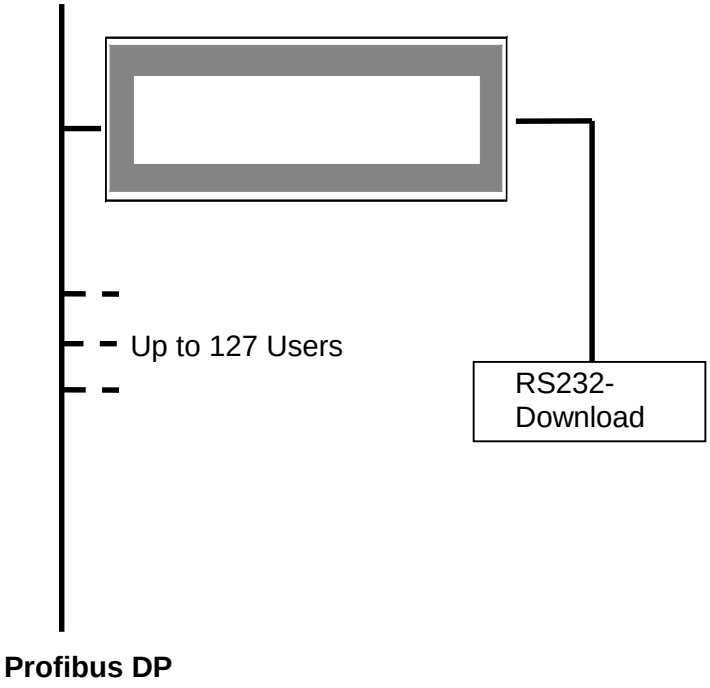
2 System Overview

The display (DP Slave) is connected to the DP master via Profibus.



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3 Technical Data

General Specifications

Display type:	vacuum fluorescent
Resolution:	5 x 7 pixels
Characters/lines:	2 lines of 20 characters each
Character height:	10.5 mm (0.41 inches)
Display colour:	cyan
Operating voltage:	24 VDC ± 20%, protected against polarity reversal
Power consumption:	300 mA at 24 VDC operating voltage
Interfaces:	Bus: Profibus DP Download: RS 232
Baud rate:	9.6 kBaud to 12 Mbaud
Addresses:	0 to 126
Display:	ASCII character set + additional characters (see table in chapter “appendix”)
Housing:	DIN panel-mount housing, metal with special surface finish
Housing dimensions:	see chapter 5
Display area:	147 x 29 mm (5.79 x 1.14 inches)
Mounting:	screw clamps
Protection:	front panel: IP65
Operating temp.:	0 to +50° C
Storage temperature:	–25 to +60 °C

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3.1 System or Device Start-Up

After supply power has been switched on, the green “RUN” LED starts blinking and the power-up message is displayed. This message includes the device designation, the selected DP address and the number of texts stored in memory.

As soon as DP communication is initialised, the power-up message disappears and the yellow “BUS” LED is illuminated continuously.

After DP communication has been ended, the power-up message reappears and the yellow “BUS” LED goes out.

DP communication may not be active when texts are being downloaded (via the RS 232 interface)!

After text downloading has been completed, DP communication can be reactivated.

3.2 Performance in the Event of Error

DP communication is not possible in the event of a faulty Profibus connection, and the yellow “BUS” LED does not light up. Please check for correct wiring to the Profibus interface in this case (bus termination etc.). In addition, make sure that the selected device address (DIP switch setting) is correct, and that input and output data lengths are within the allowable limits.

If the integrated microcontroller malfunctions, the red “ERROR” LED blinks. Make sure that supply voltage tolerances are complied with in this case.

If the above described remedies do not eliminate the respective error, please return the device for repair.

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3.3 Profibus DP Interface

3.3.1 Configuration data

The user can adapt the data width for data transfer to individual needs with the data configuration function. Various identifiers are required to this end, which can be entered in any desired order.

Byte No.	Data Identifier	Number of Bytes	Function / Description
x	10_h	1	input data, 1 byte
x	11_h	2	input data, 2 bytes
x	12_h	3	input data, 3 bytes

x	20_h	1	output data, 1 byte
x	21_h	2	output data, 2 bytes
	:	:	:
x	$2F_h$	16	output data, 16 bytes

x	30_h	1/1	input / output data, 1 byte each
x	31_h	2/2	input / output data, 2 bytes each
x	32_h	3/3	input / output data, 3 bytes each

⇨ Default configuration:

Configuration byte 0: 12_h = 3 input bytes
Configuration byte 1: $2F_h$ = 16 output bytes

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3.3.2 Input Data

The device supports input data which have been configured to the length selected during configuration. The minimum number of input data is 0 bytes, and the maximum number is 3 bytes.

3.3.3 Output Data

The device supports output data which have been configured to the length selected during configuration. The minimum number of output data is 0 bytes, and the maximum number is 47 bytes.

3.3.4 Diagnosis Data

The device does not support any extended diagnosis data. The default diagnosis is used.

3.3.5 User Parameter Data

User parameter data are not supported by the device. However, a test is run to determine if user parameter data are transferred by the Profibus master. If parameter data are transferred, Profibus initialisation is disabled and the slave's parameters must be reconfigured.

Note:
Standard parameters configuration is required and is normally installed by the utilised DP configurators.

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3.4 Control via the Profibus DP Interface

The control frames described in chapter 3.6 are transmitted by the user via the Profibus DP interface.

DP Output Data:

Index	Content	Significance
0	Toggle byte	Bits 0 to 6: The control frame is executed once for each change. Bit 7: After setting bit 7, the control frame is executed again and again automatically.
1 to max. 46	Control frame	as defined in chapter 3.6

DP Input Data:

Index	Content	Significance
0	Response toggle byte	Same as toggle byte after executing the frame
1 to 2	Response frame	As defined in chapter 3.6

Note:

When DP communication is first initialised, all DP output and input data are internally set to “0” at the device! For this reason, the toggle byte of the first executed control frame may not be set to “0”.

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3.5 Control via the RS 232 Interface

The control frames described in chapter 3.6 are transmitted via the RS 232 interface by the included PC program.

It must be assured that the pause between the individual frame bytes included in the control frame does not exceed 3 ms during transmission. The end of the frame is identified by means of a pause of at least 5 ms.

The display unit transmits the response frame immediately after execution of the command.

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3.6 Control Frames

The control frames used for controlling the display unit are defined below.

These frames are transmitted by the user via the Profibus DP interface, and by the included PC program via the RS 232 interface.

3.6.1 Displaying an EEPROM Text

Control frame:

Index RS 232 / DP	Content	Significance
0 / 1	"T" = 54_h	"Display EEPROM text"
1 / 2	Attribute	Bit 0 = 0: reserved Bit 1 = 1: blinking text display Bits 2 to 7 = 0: reserved
2 / 3	Mode	0 = display all characters 1 = display all characters after clearing the display 2 = display all characters except for blanks (20_h) 3 = display all characters except for blanks (20_h) after clearing the display
3 / 4	X position	0 (left) to 19 (right): X position of the first character
4 / 5	Y position	0 (top) to 1 (bottom): Y position of the first character
5 / 6	Text number	(0 to 65535): LOW byte
6 / 7	Text number	(0 to 65535): HIGH byte

Response frame:

Index RS232 / DP	Content	Significance
0 / 1	"T" = 54_h	"Display EEPROM text"
1 / 2	Error code	"0" = 30_h: no error "1" = 31_h: error occurred

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Note:

At the end of each line, a line break occurs to the first column of the next line, or the first line.

Example:

Display EEPROM text number 1025_d (= 0401_h) in normal display mode at the default position.

DP control frame: 54_h, 00_h, 00_h, 00_h, 00_h, 01_h, 04_h

For control via Profibus DP, it is advisable to set bit 7 of the toggle byte in this case. Only the text number must then be changed (DP indices 6 and 7) in order to display a different text.

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3.6.2 Displaying an Online Text

Control frame:

Index RS 232 / DP	Content	Significance
0 / 1	"O" = $4F_h$	"Display online text"
1 / 2	Attribute	Bit 0 = 0: reserved Bit 1 = 1: blinking text display Bits 2 to 7 = 0: reserved
2 / 3	Mode	0 = display all characters 1 = display all characters after clearing the display 2 = display all characters except for blanks (20_h) 3 = display all characters except for blanks (20_h) after clearing the display
3 / 4	X position	0 (left) to 19 (right): X position of the first character
4 / 5	Y position	0 (top) to 1 (bottom): Y position of the first character
5 / 6	Text length	1 to 40 characters
6 / 7 to max. 45 / 46	Text	ASCII characters 0 to 255 (see character set table in the appendix)

Response frame:

Index RS232 / DP	Content	Significance
0 / 1	"O" = $4F_h$	"Display online text"
1 / 2	Error code	"0" = 30_h: no error "1" = 31_h: error occurred

Note:

At the end of each line, a line break occurs to the first column of the next line, or the first line.

Example:

Display "ABC" at position X = 10 and Y = 1 (blinking display, clear display first)

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DP control frame:

01_h (previously 00_h), $4F_h$, 02_h, 01_h, $0A_h$, 01_h, 03_h, 41_h, 42_h, 43_h

The toggle byte must be changed last in this case, in order to initialise execution of the command.

3.6.3 Displaying a Number

Control frame:

Index RS 232 / DP	Content	Significance
0 / 1	"Z" = $5A_h$	"Display number"
1 / 2	Attribute	Bit 0 = 0: reserved Bit 1 = 1: blinking text display Bits 2 to 7 = 0: reserved
2 / 3	Mode	0 = display all characters 1 = display all characters after clearing the display 2 = display all characters except for blanks (20_h) 3 = display all characters except for blanks (20_h) after clearing the display
3 / 4	X position	0 (left) to 19 (right): X position of the first character
4 / 5	Y position	0 (top) to 1 (bottom): Y position of the first character
5 / 6	Data format	0 = "unsigned char" value: [9/10] 1 = "unsigned int" value: [9/10] = LSB, [10/11] = MSB 2 = "unsigned long" value: [9/10] = LSB, ..., [12/13] = MSB 3 = "signed char" value: [9/10] 4 = "signed int" value: [9/10] = LSB, [10/11] = MSB 5 = "signed long" value: [9/10] = LSB, ..., [12/13] = MSB ("signed" values in two's compliment representation)
6 / 7	Display format	0 = decimal representation: "-" or precede with " " 1 = decimal representation: "-"or precede with "+" 2 = hexadecimal representation
7 / 8	Number of places	1 to 8 displayed places (decimal representation, unused places = blanks (20_h), plus or minus sign included)
8 / 9	Layout	0 = right-justified representation 1 = left-justified representation
9 / 10	Number	Valence 2^0 (LSB = least significant byte)
10 / 11	Number	Valence 2^8
11 / 12	Number	Valence 2^16
12 / 13	Number	Valence 2^24 (MSB = most significant byte)

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Response frame:

Index RS232 / DP	Content	Significance
0 / 1	"Z" = $5A_h$	"Display number"
1 / 2	Error code	"0" = 30_h: no error "1" = 31_h: error occurred

Note:

At the end of each line, a line break occurs to the first column of the next line, or the first line.

Example:

Display decimal number with plus or minus sign ("signed int" value) = -1234_d (= $FB2E_h$).

DP control frame:

80_h, $5A_h$, 00_h, 00_h, 00_h, 00_h, 04_h, 00_h, 05_h, 00_h, $2E_h$, FB_h

After entering DP indices 1 through 11, DP index 0 (toggle byte) is set to 80_h. If another value needs to be displayed subsequently, only the number needs to be changed (indices 10 and 11).

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3.6.4 Writing Text to the EEPROM

Control frame:

Index RS 232	Content	Significance
0	"S" = 53_h	"Write text to EEPROM"
1	Memory location (0 to 255)	LOW byte
2	Memory location (0 to 255)	HIGH byte (always 0)
3	Text number (0 to 65535)	LOW byte
4	Text number (0 to 65535)	HIGH byte
5 to 44	Text (ASCII encoded)	40 bytes (1st line 20 bytes, 2nd line 20 bytes)

Response frame:

Index RS232	Content	Significance
0	"S" = 53_h	"Write text to EEPROM"
1	Error code	"0" = 30_h: no error "1" = 31_h: error occurred

Notes:

- Memory location 0: text number = number of existing texts (1 to 255 permitted)
  Text = not used
- Texts must be saved to the memory locations sorted according to text number (lowest text number at memory location 1).
- This command may only be executed via the RS 232 interface!
- This frame has no significance for the user. It is used by the PC software only.

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3.6.5 Reading Text from the EEPROM

Control frame:

Index RS 232	Content	Significance
0	"L" = $4C_h$	"Read text from EEPROM"
1	Memory location (0 to 255)	LOW byte
2	Memory location (0 to 255)	HIGH byte (always 0)

Response frame:

Index RS232	Content	Significance
0	"L" = $4C_h$	"Read text from EEPROM"
1	Error code	"0" = 30_h: no error "1" = 31_h: error occurred
2	Text number (0 to 65535)	LOW byte
3	Text number (0 to 65535)	HIGH byte
4 to 43	Text (ASCII encoded)	40 bytes (1^{st} line 20 bytes, 2^{nd} line 20 bytes)

Notes:

- Memory location 0: text number = number of existing texts (1 to 255)
  Text = not used
- In the event of an error, only the error code is returned (indices 2 to 43 do not apply).
- This command may only be executed via the RS 232 interface!
- This frame has no significance for the user. It is used by the PC software only.

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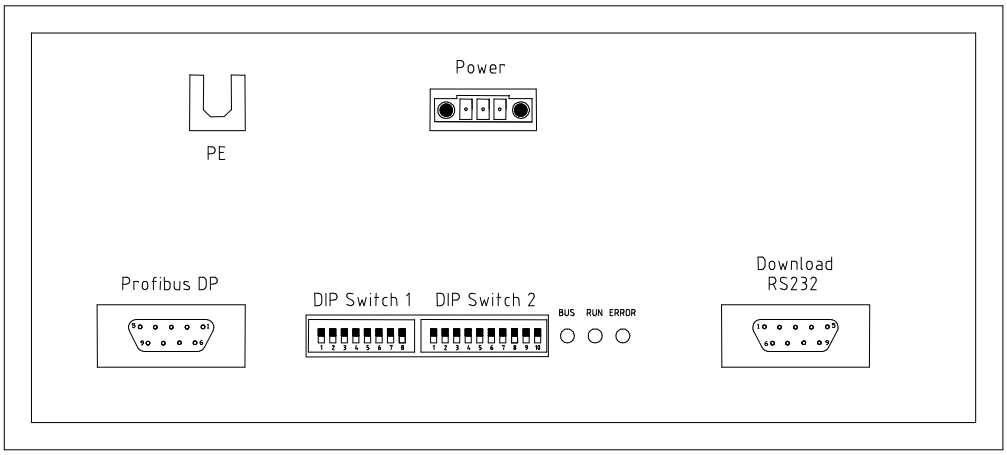
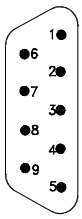
4 Connector Pin Assignments

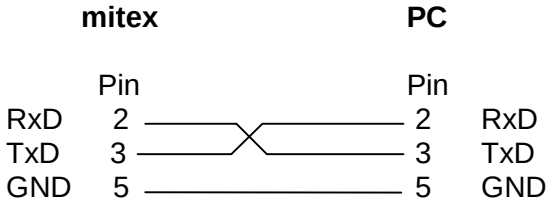


Download RS232 (9-pin sub-miniature plug connector):



Pin	Download RS232
1	n.c.
2	RxD
3	TxD
4	n.c.
5	GND
6	n.c.
7	n.c.
8	n.c.
9	n.c.

Connection mitex - PC



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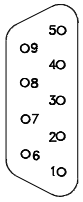
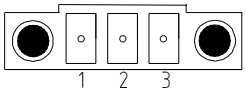
Profibus DP (9-pin sub-miniature socket connector):



Pin	Profibus DP
1	n.c.
2	n.c.
3	Rx+ / Tx+
4	RTS
5	GND ext.*
6	+5 VDC ext.*
7	n.c.
8	Rx- / Tx-
9	n.c.

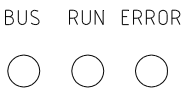
*only for bus termination

Power



Pin	Power
1	+24 VDC
2	GND
3	PE

LEDs



Designation	Description
BUS (yellow)	Continuously illuminated during DP communication
RUN (green)	Blinks at approx. 2 Hz (for monitoring microcontroller functioning)
ERROR (red)	Blinks if the microcontroller cannot be initialised correctly (e.g. poor supply power quality).

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DIP-Switch 1

DIP	ON	OFF
6	Japanese character set*	European character set*

DIP switches 1 to 5, 7 and 8 are reserved (=OFF) and must not be changed.

*see chapter “Font Table”

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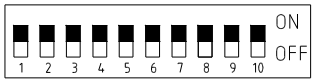
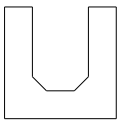
DIP Switch 2



DIP	Function	ON	OFF
1	ID no.: 2^0	1_D	0
2	ID no.: 2^1	2_D	0
3	ID no.: 2^2	4_D	0
4	ID no.: 2^3	8_D	0
5	ID no.: 2^4	16_D	0
6	ID no.: 2^5	32_D	0
7	ID no.: 2^6	64_D	0
8	Reserved	Not allowed	Must be set to „OFF“
9	Bus termination	set	not set
10	Bus termination	set	not set

Allowable DP addresses: 0 to 126

PE



This connector serves for the earth connection.

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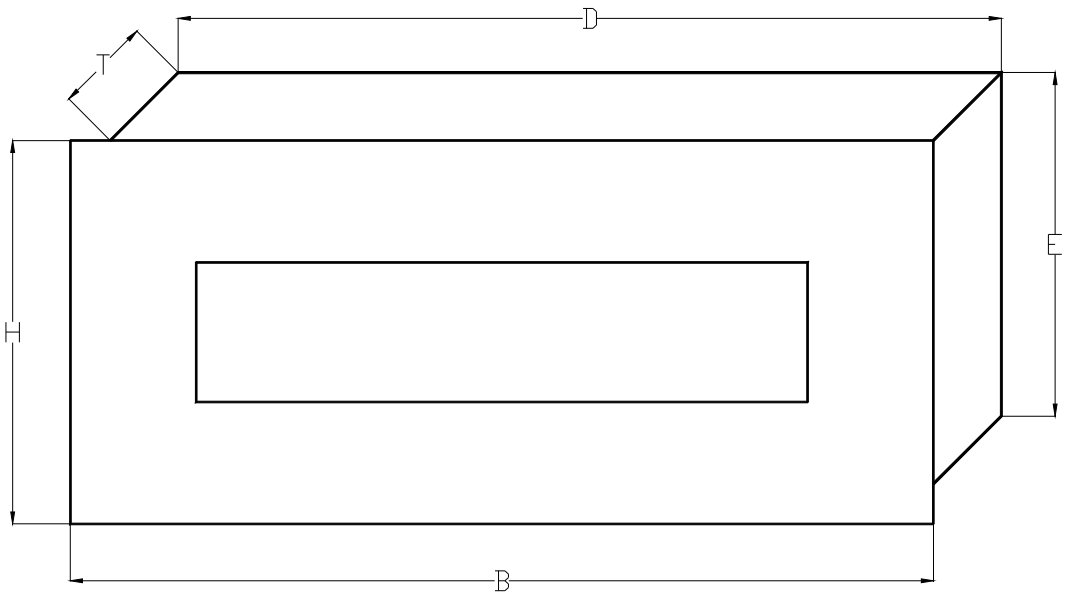
5 Housing Dimensions



Designation	B	H	D	E	T
Dimension in mm	216	96	206	86	42
Dimension in inches	8.50	3.78	8.11	3.39	1.65

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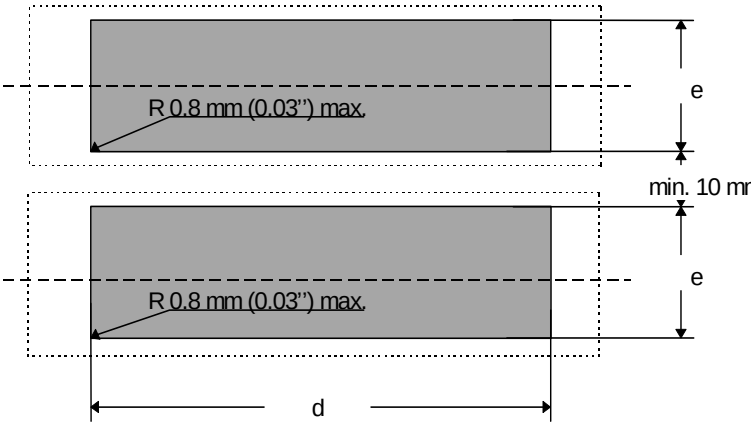
5.1 Front Panel Cutout

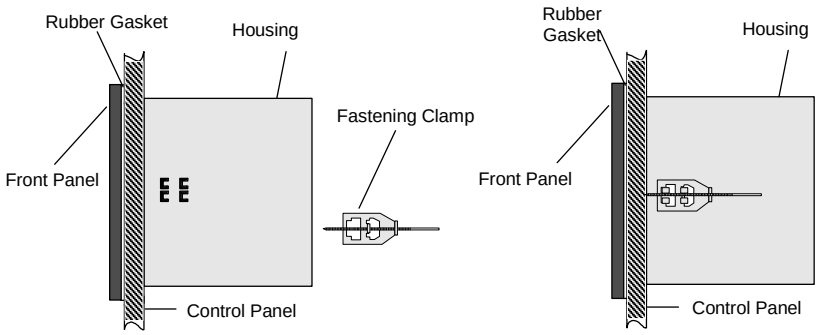


Designation	d	e
Dimension in mm	207	87
Dimension in inches	8.15	3.43

5.2 Installation / Mounting

The device has been designed for mounting to a panel. The tabs provided to this end are bent up to enable fastening of the clamps after the device has been inserted into the panel cutout.

A rubber gasket makes a watertight seal between the device's front panel and the control panel (IP65).



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6 Appendix

6.1 Standard Equipment

- Display in the current software and hardware versions
- Mounting kit (M4 screw clamps)
- Sealing frame
- User's manual
- PC software on floppy disk
- Floppy disk with DDBF.

6.2 Maintenance and Care

Observe the following instructions in order to assure best possible performance of the display:

- The display must be switched off before cleaning. Only solvent-free cleaners may be used, because plastic components may otherwise be damaged. Under no circumstances may moisture be allowed to enter the interior of the device during cleaning.

- Protect the display from excessive humidity, extreme vibration, direct sunlight and extreme temperatures. Non-observance may lead to malfunctioning or destruction of the device. Under certain circumstances electrical shock, fire and explosion may occur as well. Information concerning allowable ambient conditions, in particular recommended temperature and atmospheric humidity ranges, can be found in the chapter entitled "Technical Data".

- The display may not be placed into service if the device and/or the power cable are known to be damaged.

- Do not attempt to open or repair the device yourself. The guarantee is rendered null and void if the device is tampered with by unauthorised persons.

- Observe all notes and instructions included in this user's manual.

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6.3 Warranty / Liability

For the product, liability is assumed for defects, which existed at the delivery date according to our General Terms and Conditions.

Technically changes as well as errors are excepted. A claim for delivery of a new product does not exist. The buyer has to check the received product immediately and indicate evident defects at the latest 24 hours after detection. Non-observance of notification requirements is equated with acceptance of the defect. Not immediately visible defects have to be indicated immediately after their perception too.

Generally, defects and their symptoms must be described as accurately as possible in order to allow for reproducibility and elimination. The buyer must provide for access to the relevant device and all required and/or useful information at no charge and must make all of the required data and machine time available free of charge.

The guarantee does not cover defects, which result from non-observance of the prescribed conditions of use, or from improper handling.

If the device has been placed at the disposal of the buyer for test purposes and has been purchased subsequent to such testing, both parties agree that the product is to be considered “used” and that it has been purchased “as is”. No guarantee claims may be made in such cases.

The General Terms and Conditions of microSYST Systemelectronic GmbH in current version apply as well.

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6.4 Declaration of Conformity

EG-Konformitätserklärung
Declaration of EC-Conformity

Produktbezeichnung: **mitex FI DP VFC 2 x 20**
Product name:

Produktbeschreibung: Alphanumerische VFC-Anzeige mit Profibus-Interface /
Product description: Alphanumeric VFC Display with Profibus Interface

Hersteller:
Manufacturer: microSYST Systemelectronic GmbH
Albert-Einstein-Straße 7
92637 Weiden

Das bezeichnete Produkt stimmt mit der folgenden Europäischen Richtlinie überein: We herewith confirm that the above mentioned product meets the requirements of the following standard:		**Die Übereinstimmung des bezeichneten Produktes mit den Vorschriften der Richtlinie wird nachgewiesen durch die vollständige Einhaltung folgender Normen:** The correspondence of the above mentioned product with these requirements is proved by the fact that these products meet with the following single standards:
Nummer	**Bezeichnung**	**Europäische Norm**
2004/108/EG	**Elektromagnetische Verträglichkeit (EMV)**	EN61000-6-2:2006
		EN61000-6-4:2007

Weiden, den 04.04.13

ppa. H. Kilian

Harald Kilian

Leiter operatives Geschäft / COO
Prokurist / Authorized Signatory

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6.5 Font Table

6.5.1 European

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6.5.2 Japanese

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6.6 Versions Overview

Ver.	Date	Comments, Description
1.00	4/11/2003	Kreuzer
1.10	1/19/2006	Kreuzer: Chapter „Declaration of Conformity“ added
1.20	4/30/2009	Kreuzer: DIP switch 1, DIP8 and DIP9 always in OFF position
1.30	4/4/2013	Company address, declaration of conformity, warranty
1.40	10/23/2013	Logo

Certified per **DIN EN ISO 9001**.

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